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NOTES

ON

CASES OF TUMOUR IN THE MEDIASTINUM.

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NOTES ON CASES OF TUMOUR IN THE MEDIASTINUM.

SEVERAL examples of this interesting and somewhat rare affection having fallen under my notice during the last few years, I propose in this communication to give some of their details.

In a brief but most interesting paper published by my friend and late colleague, Dr. Budd,* these mediastinal growths are classified under the heads of *Primary* and *Secondary* Thoracic Cancer. In some of the cases I shall mention, this division is, in the absence of a complete history, difficult to make, although I am inclined to the belief that in nearly all, if not in every case, the mediastinal growth was the primary disease, and the lungs or other viscera became subsequently involved.

Secondary cancerous tumours have no special tendency to produce inflammation in the neighbouring tissues, whereas primary cancer is very apt to set up inflammation in the contiguous parts. Thus, in many of the cases alluded to, the lungs became involved by the spreading of the disease, or by pressure upon their roots. The cases appear to show that, if the vessels are compressed, gangrene results; but inflammatory action is generally consequent on destruction of the nerves, just as division of the fifth nerve causes inflammatory destruction of the eye-ball. In the first instance of the disease that came under my notice, the most marked symptoms, and those which gave rise to the fatal results, were dependent on cancer of the lung.

CASE I.—J. R., a painter, æt. forty-one, admitted into King's College Hospital, in the spring of 1856, with cough, dyspnoea, and red currant-juice-like expectoration. Percussion over the lower lobe of the right lung was dull, and here there was no vocal vibration. There was a swelling about the ninth and tenth intercostal spaces, very tender to the touch.

There was much difficulty of swallowing, and very marked

* "Transactions of the Medico-Chirurgical Society, 1859," p. 215.

pulsation of the dilated veins of the neck. The percussion note was wooden over the manubrium sterni, at the right side, and here the breathing was bronchial in character.

The patient died greatly emaciated. A tumour was found, at the post-mortem examination, encircling the aortic arch (which doubtless communicated the pulsation to the veins of the neck); the tumour extended upwards and downwards by the side of the trachea. The lymphatics of the neck were greatly enlarged.

In the lower part of the right lung was another tumour, which had pressed upon and made a concavity on the upper surface of the liver. The lung itself was a mass of cancer, partly solid and partly broken down into creamy juice.

This patient did not come under observation till a very advanced period of disease—long after the lung had become involved in secondary deposit—and the nature of the disease could not be doubted. In the following case, however, the patient was first admitted before any lung-symptoms had become developed.

The observation of this case gave rise to the paper already alluded to by Dr. Budd, in which some details are given; but from my own note-book I cull these additional facts, which bear upon some points shortly to be noticed.

CASE II.—A healthy young compositor, finding that his face became livid and that he got very giddy when he exerted himself, applied for admission at King's College Hospital. The face and neck began to swell, and the swelling increased so much on lying down, that he was forced to sleep in an arm-chair; the veins of the neck became large and tortuous, and he suffered for days together from difficulty of swallowing. Nothing abnormal could be detected in the chest on percussion or auscultation, but a suspicion of aneurism or tumour, compressing the vena cava descendens, was hinted at. The symptoms became mitigated under the use of iodide of potassium. A month later, however, the dyspnœa returned, the face became bloated, voice husky, and a loud clanging cough, with streaky, puriform expectoration, occurred.

On percussion, dulness was now detected, to the right of the middle line of the sternum, but there was no thrill or pulsation. Paroxysms of spasmodic dyspnœa became frequent, and the patient died in a fit of delirium.

A tumour was found in the mediastinum, embracing all the structures at the root of the lung. On microscopical examination the stroma was found to consist of elongated, nucleated fibre-cells, some multicaudate, the interspaces being tightly packed with aggregated cancer-cells, the appearances being similar to

those which I have since observed in two or three of the other cases to be described.

A very similar case has been detailed by Dr. R. Bennett,* in which the intra-thoracic growth involved the same parts. It occurred in a female, æt. forty-eight. In this case the left pleura was full of fluid, and the lung œdematous.

CASE III.—C. H., æt. forty-four, a cabinet-maker, applied to me, in July last, as an out-patient, at the Hospital for Chest Diseases, at Brompton. For several weeks he had suffered from shortness of breath on exertion, which gradually increased till he became unable to walk more than a few steps without resting. When first seen he had some cough and expectoration; his voice was feeble, speech and deglutition difficult; the face was suffused, eyes prominent, throat and neck puffy and œdematous, the external, jugular, and other veins at the root of the neck being large and full, the patient having the appearance of a strangled person. The left radial pulse was more feeble than the right. Percussion was very dull over the whole sternum; here tracheal breath-sounds were audible, and the sounds of the heart were also very distinct, as high as the root of the neck, but there was no murmur, abnormal cardiac sound, impulse, or thrill. Posteriorly there was loud tracheal breathing over the five upper dorsal vertebræ, and here an unusually dull sound was elicited on deep percussion. The breathing was hurried and shallow, and the respiratory murmur, mixed with sonorous *râles*, was heard feebly all over the chest, less air appearing to enter the left than the right lung.

It was at once evident that the mediastinum was occupied by a tumour, compressing the trachea, œsophagus, and superior cava, and also interfering with the circulation in the left arm. From the absence of cardiac murmur, thrill, or pulsation, there seemed no reason to believe that aneurism existed, nor was it thought probable that the tumour could be of a strumous character, as the patient was a healthy man, without a scrofulous family history. The diagnosis of carcinomatous mediastinal tumour was at once made, and a very unfavourable prognosis given. The patient declined to enter the hospital, although urged to do so. Under the influence of an active purge of aloes and senna, repeated daily, the breathing became more easy, the difficulty of swallowing lessened, and the puffiness of the face and neck subsided.

When next seen, a week after his first visit, there was, however, no material change in the symptoms or physical signs. Iodide of potassium was now ordered in free doses, and counter-irritation to the chest.

* Vide "Transactions of the Pathological Society," vols. v. and viii.

The cough increased rapidly, the expectoration became sanguineous, and the patient died a few days after his second visit.

A post-mortem examination was performed by the House-Physician of King's College Hospital, and a tumour, as large as two fists, occupying the position indicated during life by the post-sternal dulness, extending upwards on either side of the trachea, as high as the cricoid cartilage, downwards to the pericardium and the roots of the lungs, especially the left, and involving the large vessels in one mass, which was bounded posteriorly by the compressed cesophagus and vertical column. The tumour was irregularly lobulated, of a white colour, like brain-tissue, but of much harder consistence, exuding milky juice on section. It involved the superior cava, the innominate and azygos veins, the innominate artery, as well as the carotid and subclavian of the left side, and the whole aortic arch. The pneumogastric and recurrent laryngeal nerves passed through the mass, but did not appear to be compressed or flattened. The pulmonary artery vein and bronchus were embraced by the tumour; several large bronchial glands, containing softened tissue, were scattered about. The left carotid, with the pneumogastric and sympathetic nerves, were imbedded in a prolongation of the tumour, which extended as high as the fourth cervical vertebra.

The pericardium contained a few ounces, and the left pleura a few pints, of serum. There was no lymph or other evidence of pleurisy, save a slight adhesion at the right apex. No disease was detected in the lungs or in any other organ. The abdomen was not examined.

On microscopic examination the tumour was found to consist of fibrous tissue, from which exuded aggregated granules, free nuclei, fat globules, and irregularly-formed cells, resembling pus-globules, contrasting remarkably with the tubercular matter contained in a softened bronchial gland, which consisted of irregularly-formed granular corpuscles, all of the same size, whereas the cells contained in the cancerous mass varied from mere granules to two or three times the size of pus-corpuscles.

It is not very usual to find so many of the characteristic symptoms co-existing, and the diagnosis can seldom be made so rapidly and confidently as in this case; for, besides the very marked physical signs already detailed, all these general symptoms pointed to the existence of mediastinal disease.

Gradually increasing dyspnoea; elongating laryngeal cough feeble voice; speech and deglutition difficult; face suffused, eyes red and prominent; throat and neck puffy and cedematous jugular, axillary, and mammary veins congested; left radial puls smaller than right.

CASE IV.—A few months since a thin, pallid boy, æt. seven

teen, applied as an out-patient at the Hospital for Consumption and Diseases of the Chest, at Brompton, suffering from shortness of breath. He had been ill three weeks.

On examining the chest, the right side, which moved very little even on deep inspiration, was bulging and prominent. The intercostal depressions were obliterated; the bulging was most marked anteriorly, in the mammary and infra-mammary regions; there was some redness of skin, and enlarged veins ramified tortuously over the chest and abdomen; several enlarged glands were visible in the pectoral and axillary regions. On percussion the whole side was dull, from the clavicle to three inches below the costal cartilages, at which point the edge of the liver could be felt, the dulness extending to the left side of the sternum. The percussion note was not absolutely dull behind, above the angle of the scapula, where vesicular breathing could be heard on auscultation; in front, however, and in the axilla no normal breath-sound could be heard; but a distant bronchial breathing was detected beneath the clavicle and all over the most prominent portion of the chest. No vocal thrill or vibration could be detected anywhere on this side. The apex of the heart was felt beating three inches below and three inches to the outer side of the nipple, where a very distinct systolic murmur was detected.

My colleague, Dr. Cotton, who examined the patient with me, inclined to the opinion that this unusual combination of symptoms arose from the presence of a malignant growth in the chest. As the boy could not be at once admitted into the Brompton Hospital, he was sent to King's College Hospital, where he was taken in under the care of Dr. G. Johnson, who, after some consideration, introduced a grooved needle between the fourth and fifth ribs, an inch external to the right nipple, and drew off fifty-six ounces of serum. The prominence remained as before, but the chest became tympanitic on percussion, with splashing and marked succussion sounds; the dyspnoea continued urgent; pulse, 120; respiration, 32. The lips became blue and feet cedematous. After a few days there was some flattening beneath the clavicle, and the circumference of the chest, which, on admission, was as follows:—

On level of nipple, right side, 16 inches;	left, 14½ inches;
became	"
"	"
"	15
"	"
"	15
"	"

The tympanitic resonance gradually diminished, and the dulness, which had remained absolute in the sternal region, extended more to the right side; here the bronchial breathing, which ceased on the removal of the fluid, was replaced by loudly-conducted heart-sounds. The dyspnoea and blueness of face varied from day to day, but six weeks after the operation the patient became drowsy and died comatose.

At the post-mortem much serum was found in both pleuræ, but no lymph or evidence of inflammation in either. In the anterior mediastinum was a hard white mass, the size of a fist, attached to the upper surface of the diaphragm, surrounding the trachea and root of the lungs, slightly adherent to the sternum and costal cartilages. The parietal layer of the pleura was thickened by a deposit of the same material, and the right lung was small, compressed, and adherent to the chest-wall behind. The mitral valve was slightly roughened, and the liver depressed from its natural position.

I cannot pass from this case, the diagnosis of which gave rise to much difference of opinion, without making a remark or two.

When first seen I was led to fancy, from the sallowness of skin and enlargement of veins, that the disease might be one of the liver, especially as I had watched a case of hydatid of the liver which produced a precisely similar bulging of the right side of the chest, but the limitation of the dulness to the right side and the respiratory sound heard over the tumour dispelled this idea; while the absence of history of sudden fever, with pain in the side, the bronchial breathing heard over the projecting part of the chest, the extreme enlargement of the side, which could hardly have arisen from empyæma without previous pneumothorax, the absence of fluctuation in the bulged intercostal space, and the unnatural distinctness of the transmitted heart-sounds, rendered the diagnosis of simple pleuritic effusion impossible. The insidiousness of onset, unyielding solidity, adherence of the reddened skin to the parts beneath, obstruction of veins, enlargement of glands, bronchial character of respiration, and, lastly, the fact that the mother of the lad was suffering from tumour, led to the conclusion that the disease must be of a carcinomatous nature. But the rarity of such disease, especially in very young subjects, and the rapid growth of so extensive a mass, made the diagnosis a doubtful one; and it was partly with a view to ascertain what was the real state of the case that a grooved needle was introduced, with the result already described.

The removal of the fluid, however, did not clear up all difficulty. That the simple effusion of serum should lead to such bulging of the chest was difficult to conceive; moreover, the bulging did not lessen on the escape of all the fluid (56 oz.) that could be evacuated.

I must confess that at this time, and until the death of the patient, I was at a loss to account for the symptoms. Had the following case fallen previously under my notice, I might have at least surmised the real nature of the disease:—

A. B.—was admitted into King's College Hospital with all the signs of pleuritic effusion, but without any history of an

acute attack. The disease did not yield to treatment, and the patient, who had been throughout in a miserable state of debility, died from asthenia.

At the post-mortem the right pleura was found full of clear serum; the lung, compressed and hobnailed, about the size of a pine-apple, occupying the pre-vertebral groove. The whole front of the chest was lined by a mass of solid tissue, varying from half an inch to two inches in thickness, covering the pericardium and extending laterally on either side of the sternum.

A somewhat similar case has been recorded by Dr. Barker ("Transactions of Pathological Society," vol. vii., p. 47), in which, besides a lobulated growth in the upper part of the mediastinum, a second flattened mass was attached to the whole anterior surface of the pericardium. In this case also the right lung was collapsed and nodulated, the pleura being full of turbid fluid. Cases of this kind make an impression on one's memory, and greatly lessen the difficulty of diagnosis in analogous cases that may fall under observation.

In the "Dublin Medical Press" for October 12th, 1864, a case is detailed in which the heart was displaced to the left in consequence of effusion into the right pleura. A loud systolic murmur occurred at the apex, which disappeared on the removal of the fluid by paracentesis. In this case a trace of thickening in the mitral valve, insufficient to account for the murmur, was observed. In the case I have fully detailed the roughening of the valve was very slight; but as the murmur was persistent and not influenced by the withdrawal of the pleuritic fluid, we must infer that the roughening was the cause of the murmur, especially as murmurs at the mitral valve, caused by displacement, are very rare. Dr. Benson, of Dublin, considers his case unique.

In both these instances the right lung was greatly compressed, not so much, however, as in the case of a patient at the Brompton Hospital, whose post-mortem I recently attended, in which the lung was not larger than the forefinger, and could scarcely be detected as it lay covered with condensed pleural tissue in the pre-vertebral groove. In this case the heart was pulled over to the right side and pulsated beneath the right nipple. The whole left side in the precordial region was resonant on percussion, and the anterior edge of the left lung extended beneath the right clavicle and occupied the space vacated by the upper lobe of the right lung.

A case occurred at King's College Hospital, recorded in the "Pathological Transactions," vol. x., p. 62, in which a cancerous tumour, occupying the interval between the œsophagus and trachea, projected into the latter so as to narrow the canal, and

communicated by an ulcerated opening with the œsophagus. In this case the difficulty of breathing was so great, that tracheotomy was contemplated, and I urged immediate recourse to the operation; but in the absence of the physician under whose care the patient had been admitted, this was postponed, and death occurred in a paroxysm of dyspnœa.

A similar case is recorded in the same volume of the "Transactions," in which life was prolonged and much suffering removed by this operation.

About the same time another case fell under my notice, also in King's College Hospital, of which I have preserved notes; and as this has never been published, I will give a few details:—

Thos. Gale, æt. forty-five, was admitted under the care of Dr. Budd, in December, 1858, with inability to swallow either solid or liquid food. The dysphagia had existed for twelve months; a probang had been occasionally passed and always met with an obstruction opposite the thyroid cartilage. At the time of admission the obstruction was almost complete, and the patient wasted rapidly from want of food, everything swallowed being coughed up or regurgitated a minute or two after it was taken. After some persevering efforts, Mr. Fergusson succeeded in passing the tube of the stomach-pump beyond the constriction, but no food was injected as had been at first suggested. An attempt was made to keep the patient alive by means of nutritive enemata, but without success, and the patient rapidly sank. At the post-mortem examination the bifurcation of the trachea was found to be imbedded in a mass of hard cancerous material, which involved also the arch of the aorta and the œsophagus, and was adherent behind to the pre-vertebral aponeurosis in front of the fifth and sixth cervical vertebræ. This carcinomatous tumour was of a rounded outline, but sent prolongations into the interspaces between the right and left bronchi, between the aorta and trachea, and between the trachea and œsophagus. The tumour was about three and a half inches in length, and extended from the third ring of the trachea to an inch below the bifurcation. The apparent size of the mass was increased by numerous large bronchial glands filled with pigment. The free surface of the tumour was smooth, but slightly nodulated. On the left side a deep groove existed, formed by the transverse portion of the aortic arch. The tissue at the root of the lung was hard, white, and glistening. Opposite the cricoid cartilage the œsophagus was found contracted so as scarcely to allow the passage of the forefinger, and on a level with the fifth tracheal ring it was constricted to the size of a crowquill. Below the first constriction the mucous membrane was eroded, and the channel widened into a large, almost gangrenous cavity, common to the trachea and œsophagus. From this cavity the right and

left bronchi diverged, and the trachea opened into it at its eighth ring; the eroded tracheal cartilages projected into the cavity; the surrounding parts were of scirrhus hardness, composed of fibrous tissue and degenerated epithelial *débris*. Many of the compound cells of which the mass consisted were multinuclear; others contained a good deal of oil and granular matter. The stroma consisted chiefly of yellow fibrous tissue.

The channel of emergence of the œsophagus was surrounded by a thick cartilaginous ring of carcinomatous tissue, but below this point the gullet was quite healthy.

A most interesting instance of this disease fell under my notice a few months ago. The patient was a German Professor, under the care of my colleague, Dr. Pollock. The tumour, from being quite imperceptible, grew while the patient was under observation, until it projected considerably through the sternum and intercostal spaces, and by its inward pressure gave origin also to a variety of symptoms similar to those observed in the other cases. This was the only instance I have seen in which the projecting tumour became inflamed on the surface, and, by involving all the neighbouring skin and subcutaneous structures, assumed all the characters of external cancer,

A case has been put on record by Mr. T. Holmes (*vide* "Pathological Transactions," vol. iv., p. 29), in which an encephaloid tumour of the mediastinum projected at the right side of the sternum; it pulsated strongly, and a systolic murmur was audible over the tumour and at the base of the heart, and gave rise to a suspicion of aneurism.

The following case was looked upon, when under treatment at King's College Hospital in 1858, as an instance of aortic aneurism, but when admitted into Guy's, a few months later, it was considered to be a case of mediastinal carcinoma. I will relate the symptoms, which I think will tell their own tale:—

G. J——, æt. thirty-four, a stone-mason, felt, while sawing stone, a sudden pricking pain below the right nipple, which was much aggravated by coughing. The face and arm became puffed and œdematous, and the superficial veins of the neck and chest turgid; after six weeks a swelling was noticed. The upper part of the sternum and the right costal cartilages became protruded, forming a prominence four inches in vertical and two in lateral measurement. Here percussion was dull and pulsation distinct. Two sounds were audible over the tumour similar to those over the aortic valves, but louder. There was no bellows-murmur; pulse at both wrists equal; respiratory-murmur feeble over right lung, throughout, with slight wheezing behind; breathing tracheal over upper dorsal spines. Rest in bed was enjoined, full diet without stimulants, and chloric ether

with paregorie to quiet the cough. The aching at the shoulder lessened, the tumour became less prominent, and after three weeks the patient returned to work, though he had much cough and dyspnœa, with occasional difficulty of swallowing and sanguinolent expectoration.

In January, 1859 (three weeks afterwards), the superficial epigastric and infra-mammary veins were very large, tortuous, and freely inosculating. No pulsation was appreciable in the tumour, but an impulse was to be felt through it, and the two sounds of the heart were to be heard with the stethoscope. The dulness on percussion extended from the sternal notch three inches in a vertical and three in a transverse direction. Breath sounds almost equal in the two lungs. Right radial pulse slightly stronger than left; apex of the heart beating three inches below the nipple, between the seventh and eighth ribs.

About a month afterwards, this patient was admitted into another metropolitan hospital, where, in the absence of history, the case was very naturally regarded as one of mediastinal tumour, probably cancerous. There can, however, I think, be little doubt that it was really an aneurism of the thoracic aorta undergoing spontaneous cure.

I cannot leave this case without remarking that rest in bed, so as to avoid all exertion, with simple unstimulating food, is followed not unfrequently by marked improvement in cases of aneurism, and that our prognosis should not be invariably hopeless. Most of us have met with one or two instances in which undoubted aneurisms have ceased to extend, and then gradually undergone contraction, and this without any very special medication. Lymph is poured out by the aneurismal sac; and if, from the quietness of the circulation, it has once an opportunity of becoming fully organized, it may withstand the full expansile influence of the blood-current.

In September, 1863, a patient died in the Brompton Hospital, thought to have a tumour in the mediastinum of a cancerous character. Paroxysms of dyspnœa occurred on exertion, and there was rhonchus all over the chest, with a loud clanging cough. The heart sounds were feeble, and there was no murmur, pulsation, dulness, or dysphagia, nor any history of rheumatism or of a blow on the chest. The autopsy showed an enormous dilatation of the arch of the aorta pressing against the sternum, trachea, and recurrent laryngeal nerves. The lungs were emphysematous at the edges.

A case the exact converse of this is detailed in Dr. Fuller's work "On Diseases of the Heart and Large Vessels," in which a mediastinal cancer gave rise to a prominent pulsating swelling on the side of the sternum, with a rough systolic murmur heard

over the dull portion of the chest both in front and behind. Although there was no dyspnœa, ringing cough, hæmoptysis, dysphagia, or other general symptoms, or history of aneurism, the physical signs were implicitly relied upon, which, with the exception of the absence of expansile character in the pulsation, seemed those of aortic dilatation.

The consideration of the three cases just detailed leads one to attach importance, in forming a diagnosis between aneurism and other tumours of the mediastinum, to the character of the pulse, which is less often unequal in the two radials in cancer than in aneurism. The same may be said of diversity in the size of the pupils. Pain, usually persistent in aneurism, is generally absent in cancer; enlargement of the superficial veins and cedema of the face, neck, and upper extremities is more usual in cancer; for aneurismal tumours, which are soft and yielding, do not usually create such obstruction in the veins as to render necessary the establishment of a collateral venous circulation. Malignant growths invade equally all the tissues in which they are formed, and thus cause constriction or closure of the large veins; for the same reason, and in the same manner, the circulation and nutrition of the lungs is impaired, and cancerous consolidation or even gangrene of the pulmonary tissue results.

If the tumour projects visibly from the chest, the left side of the sternum is somewhat the most usual seat, whereas aneurism is more common on the right. Pulsation, if it occur at all in cancer, is transmitted, not expansile in character, and the dullness on percussion is extensive in proportion to the extent of pulsation.

Not unfrequently, too, as has been shown, adhesion of the diseased lung to the pleura occurs with or without effusion. The pleura often becomes greatly thickened by morbid deposit, and the pericardium is occasionally thickened in the same way.

If any murmur is audible over a mediastinal cancer, it is similar in character to that heard at the base of the heart, and the cases described show that it is not unusual to hear loud tracheal breathing over the morbid growth.

In the diagnosis between these two conditions, however, the previous history and aspect of the patient often afford very valuable, if not conclusive data.

Aneurism affects the middle-aged; cancer, the young or the old. The first is often sudden in its origin, and the wheezing cough, aphonia, dyspnœa, or dysphagia vary with change of posture, and recur at intervals as the disease advances, whereas the pressure-signs of cancer are progressive, never retrogressive.

I should have been glad if space would have allowed me to

have alluded to several cases of aneurism, two of them now under treatment, which bear in an instructive way on the subject of this communication. Two cases of periosteal swelling upon the sternum, simulating aneurism or mediastinal disease, have lately been under my care. In one of these, the paroxysmal dyspnoea, combined with a prominent growth on the left side of the manubrium sterni, led to a suspicion of aneurism; but the projection rapidly disappeared under iodide of potassium and iodine ointment. In the second case, the node suppurated. In both, the disease was of syphilitic origin.

THE END.